Appeal No. 2013-1454

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

PROMEGA CORPORATION,

Plaintiff-Appellee,

v.

APPLIED BIOSYSTEMS, LLC,
LIFE TECHNOLOGIES CORPORATION, AND CALIFORNIA INSTITUTE OF TECHNOLOGY,

Defendants-Appellants.

Appeal from the United States District Court for the Northern District of Illinois in case no. 13-cv-2333, Circuit Judge Richard A. Posner

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Counsel for Plaintiff-Appellee Promega Corporation certifies as follows:

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   Promega Corporation

2. The name of the real party of interest represented by us is:

   Promega Corporation

3. All parent corporations and any public companies that own 10 percent or more of the stock of the parties represented by us are:

   None

4. The names of all law firms and the partners or associates that appeared for the party now represented by us in the trial court or are expected to appear in this Court are:

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STATEMENT OF RELATED CASES

Promega Corp. v. Life Tech., Appeal Nos. 2013-1011, -1029, -1376, is pending before this Court. In that case, Promega Corporation ("Promega") alleges that Life Technologies Corporation ("Life") and Invitrogen IP Holdings, Inc., infringe five patents, none of which are involved in this case. This case and *Promega Corp. v. Life Tech.* both involve the same 2006 Cross License. Counsel knows of no other cases pending in this Court or any other court that may affect or be affected by this case.

PRELIMINARY STATEMENT

Thirty years ago, on January 16, 1984, Caltech filed the first application in a chain that eventually led to the patent in suit, U.S. Patent No. RE43,096 ("the '096 patent"). That application described the automation of DNA sequencing by using previously known, fluorophore-labeled oligonucleotides[1] in single-lane sequencing, rather than four lanes, which was well-known. Twenty-five years later, Appellants drafted the claims of the '096 patent in an attempt to capture Promega's products that involve DNA "fingerprinting," not sequencing. In the asserted claims,

[1] An oligonucleotide is a short, linear chain of nucleotides, e.g., a short single-stranded fragment of DNA. A28-29.

Appellants discarded the actual invention in an attempt to obtain a thirty-four year monopoly on the chemistry of attaching a fluorophore to an oligonucleotide and using these compounds for any purpose. In doing so, they rendered their claims invalid.

The chemistry for attaching a fluorophore to an oligonucleotide, and the utility of these compounds in sequencing methods, were described and claimed in patents that are already expired. Two of these expired patents, U.S. Patent Nos. 5,118,800 ("Smith '800") and 5,118,802 ("Smith '802"), belong to the California Institute of Technology ("Caltech") and share a common inventor, Lloyd Smith, with the '096 patent. Caltech licensed these expired chemical compound patents very successfully, and, contrary to Appellants' argument, they are prior art to the '096 patent.[2] Through reissue proceedings, Appellants have transformed the claims of the '096 patent to read on the now-expired chemistry patents. The result of Appellants' efforts is that the asserted claims are invalid.

The '096 patent reissued from U.S. Patent No. 6,200,748 ("the '748 patent"), which Applied Biosystems and Life's predecessor-in-interest

[2] Appellants Applied Biosystems, LLC, ("Applied Biosystems") and Life are licensees of the '096 patent.

unsuccessfully tried to assert against Promega over a decade ago. A5459. During that previous litigation, the U.S. District Court for the Western District of Wisconsin construed two claim limitations, "oligonucleotide primer" and "template," so that the '748 patent's claims were directed to Sanger sequencing methods and compositions for use therein. A5468. Because Promega's accused DNA analysis products are not used for Sanger sequencing, its products did not infringe the '748 patent's claims.

After the adverse claim construction, Appellants sought reissue of the '748 patent in 2003. A81. In 2006, while the reissue was pending, the parties settled multiple disputes, including the '748 patent litigation, and entered into the Cross License. A541-63. Under the Cross License, Promega agreed to pay a 2% royalty on products in "the Genetic Identity Field" of use ("the Field of Use"), but only if the products infringed valid, reissued claims. A542, A546. During reissue, Appellants canceled all claims of the '748 patent and obtained new claims, deliberately omitting the claim limitations construed by the Wisconsin district court. A99-103[11:37-20:14]. In doing so, they untethered the reissue claims from the invention described in their 1984 specification, which was an improvement to sequencing.

The ’096 patent reissued on January 10, 2012, when Promega was on the eve of trial with Appellants Applied Biosystems and Life over different patents. Applied Biosystems sent a letter to Promega demanding an immediate royalty payment based on the reissued claims. A483-84. In response to the demand, Promega initiated this declaratory judgment action in the Western District of Wisconsin on January 31, 2012. A330-36. Appellants eventually limited the scope of the lawsuit to independent claims 62, 66, 67, and dependent claims 63, 65, 70, 74, 80, 86, 92, and 98, all of which depend from claim 62. A6542-43.

Below, Appellants sought and obtained broad claim constructions, which no party challenges. Those constructions do not limit the claims of the ’096 patent to Sanger sequencing, let alone single-lane sequencing. A27-31. Appellants insisted, throughout the Markman proceedings, that the ’096 patent’s invention is the chemistry of attaching a fluorophore to an oligonucleotide, and not limited to sequencing. A5791, A17929. Appellants told the district court:

> [T]he chemistry aspect of that work is what’s at issue here. The chemistry aspect of automated DNA sequencing was innovative and patentable by itself. And so that is what this patent claims.

A17929. Appellants were right: the chemistry was patentable—the problem for them is that the chemistry was patented in the now-expired Smith '800 patent.

The asserted claims are additionally invalid in view of U.S. Patent No. 4,948,882 ("Ruth '882"), issued to Dr. Jerry L. Ruth. Ruth '882 discloses attaching fluorophores to oligonucleotides for the purpose of sequence analysis, and unrebutted expert evidence demonstrates that Dr. Ruth's fluorophore-labeled oligonucleotides were extendible. A11339-91, A18131-32. Appellants' attempt to unnaturally extend their monopoly and to cover technology developed many years later, has also rendered asserted claims invalid under 35 U.S.C. § 112. Each basis of invalidity is demonstrated by intrinsic evidence, prior art patents, and the inventors' and Appellants' expert's admissions. The district court did not err in its judgment of invalidity.

STATEMENT OF THE ISSUES

1. Whether the district court properly held that Smith '800 is prior art under 35 U.S.C. §§ 102 (e) and 103 based on its prior filing date and the undisputed fact that it was invented by a different entity and not under a common right of ownership.

2. Whether the district court properly granted summary judgment that claim 62, its dependents, and claim 66 are anticipated by Smith '800, and, as alternative grounds of affirmance, whether Smith '800 renders all asserted claims obvious.

3. Whether the district court properly determined that claim 62, its dependents, and claim 66 are invalid due to obviousness-type double-patenting ("ODP") in view of Smith '800, and, as alternative grounds of affirmance, whether claim 67 is invalid for the same reason.

4. Whether the district court properly granted summary judgment that claim 67 is obvious in view of Ruth '882, and, as alternative grounds of affirmance, whether Ruth '882 also renders claim 62, its dependents, and claim 66 obvious.

5. Whether the district court properly granted summary judgment that claim 62, and its dependent claims, are invalid for failure to meet the written description requirement of 35 U.S.C. § 112.

6. Whether the district court properly exercised its discretion in excluding testimony of Appellants' damages expert, who ignored the most relevant license, the 2006 Cross License, and arbitrarily narrowed the licenses he considered, from which he opined on a reasonable royalty without considering economic or technological comparability.

STATEMENT OF THE CASE

Appellants' statement of the case omits several material points, which are described below. The parties disputed several claim terms and the district court construed them in large part precisely as Appellants argued. A27-31. For example, "oligonucleotide" and "complementary strand of DNA" were construed consistently with their ordinary meanings. A29-30.

The parties also disputed the meaning of claim 62's preamble, "[a] method of nucleic acid sequence analysis." Although the district court agreed with Promega that the preamble was limiting, it rejected Promega's proposed construction, and instead adopted Appellants' view that

"sequence analysis" was not limited to "sequencing." A27-28. The district court construed the preamble as "*any* method of obtaining information about a genetic sequence," A28 (emphasis added), even though only one such method is disclosed.

In light of these constructions, the district court found a representative Promega product to infringe several of the asserted claims, in part because it "measures and compares the length" of specific regions of DNA found in the human genome called "STRs," or "short tandem repeats." A32-33. Accordingly, the length of an STR is the "information about a genetic sequence." The district court also found that Promega owed royalties under the Cross License, which Promega has paid. A42.

On May 31, 2013, the parties filed a second round of summary judgment motions. Promega's motion relied, in large part, on Appellants' representation throughout the litigation that the invention date of the '096 patent's claims was the filing date, January 16, 1984. A14348, A14403-04, A14407-08. Only after Promega served its opening brief did Appellants attempt to rely on an alternative invention date. A16364-76. On May 31, 2013, at 11:58 p.m., in the final two minutes of fact discovery, Applied Biosystems and Life attempted to supplement their interrogatory responses

to assert an earlier invention date. A16364. Promega successfully moved to strike the supplemental responses. A16332-76, A57-58.

In response to the summary judgment briefing, the district court asked for briefing on whether the asserted claims were invalid for ODP based on Smith '800. A59. No party requested additional time for briefing. Each party submitted its brief to the district court and had ample opportunity to argue its positions.

After conducting a hearing on these issues, the district court ordered summary judgment in Promega's favor. A60-79. Judgment was entered on June 13, 2013. A80.

STATEMENT OF THE FACTS

I. The '096 patent and the prior art.

Methods of DNA sequencing were well known in the early 1980s. Sanger sequencing, for example, was developed in the late 1970s and was in "widespread use" by 1984. A94[1:61-63]. Sanger sequencing allows scientists to determine the order and identity of nucleotide bases (A, C, G, and T) in a fragment of DNA. A94[2:21-23].

Sanger sequencing, as described in the '096 patent and by Appellants' expert, begins with a cloning vector. A94[1:66-2:5], A11680-81. A cloning

vector is a small piece of DNA maintained in an organism and into which a foreign DNA fragment can be inserted for cloning so that the foreign DNA can be copied and analyzed. One example of a cloning vector is the M13 virus. A94[1:66-2:5], A11680. In the 1980s, scientists knew how to design oligonucleotide primers that hybridized to only one location on the M13 vector. A11680-81. A short piece of DNA to be sequenced, called a cloned insert, was inserted into the M13 vector using standard biochemical reactions. A96[6:1-9], A11680. Scientists then replicated the M13 virus by allowing it to infect a bacterial host, creating millions of copies of the clone. A94[1:49-53]. This process generated enough DNA to be analyzed.

As shown in Figure 1 below and described by Appellants' expert and the '096 patent, the replicated DNA strands were then subjected to four separate reactions, one for each nucleotide base, A, C, G, and T. A94[2:2-23], A11638-40. These reactions proceeded via polymerase extension of an oligonucleotide primer that was hybridized to a specific location on the cloning vector. A94[1:55-60], A11638-40. The reactions employed four dideoxynucleotides or terminators. A94[2:9-13], A11638-40. The terminators were randomly incorporated into the extending oligonucleotide primer, rendering further extension impossible. A94[2:9-

13], A11638-40. The extended oligonucleotide primers were then separated from the cloning vector. A94[2:2-23], A11638-40. One of the reactions, the C reaction, is highlighted in Figure 1 below. The end result of these four reactions was a collection of DNA fragments that vary in length by a single nucleotide. A90[Fig. 3], A11640.

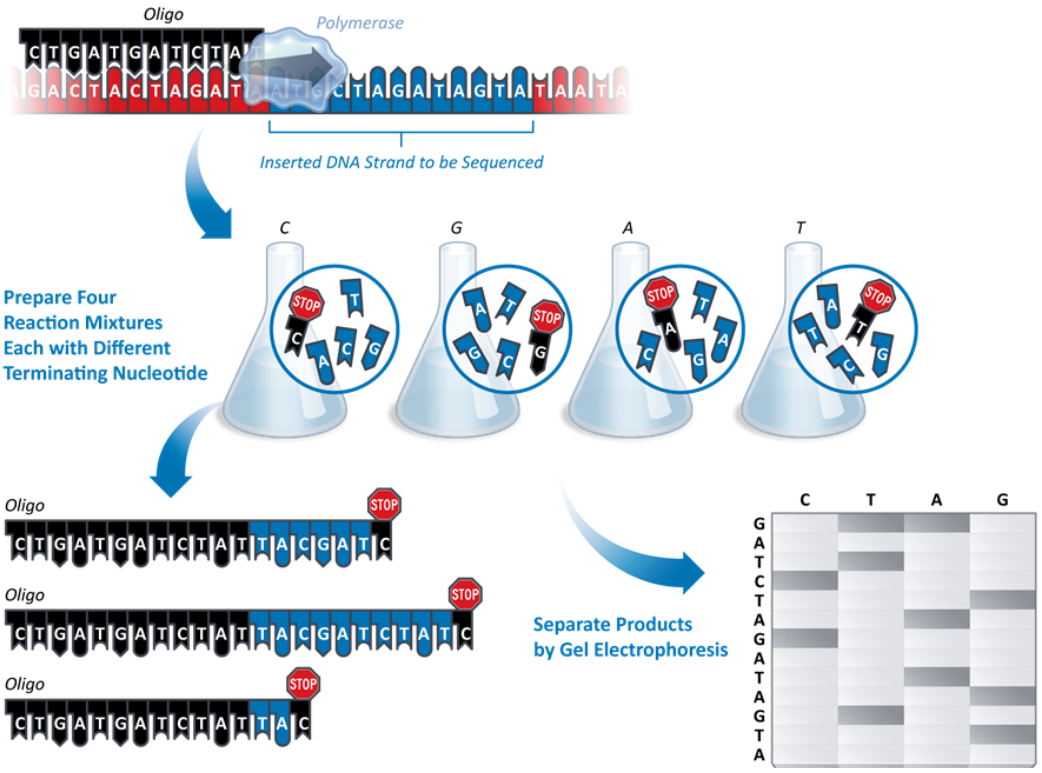

Figure 1 – Sanger sequencing: the four sequencing reactions, and electrophoretic separation in a gel. The terminators are shown indicated with the "stop signs." A14326.

The size-nested DNA fragments were then placed into four lanes of a polyacrylamide gel and separated. The DNA sequence was then read from

the gel. A94[2:16-23], A90[Fig. 3], A11640. The prior art's use of four lanes on the gel was necessary because the radioactive labels used to label the oligonucleotides were indistinguishable from one another. A90[Fig. 3]. Appellants have never contested this description of Sanger sequencing, and it is consistent with the description given by their expert, Dr. Norman Dovichi. A11638-40. The basic features of Sanger sequencing, e.g., specific hybridization and extension by polymerase, are limitations in many of the claims at issue here.

One other method of sequencing, the Maxam-Gilbert method, was equally widespread by the early 1980s. A94[1:61-65]. The Maxam-Gilbert method does not rely on extension of an oligonucleotide by a polymerase, but on chemical fragmentation of DNA. A94[2:24-41]. This method also relied on radioactive labels.

Radioactive labeling had several flaws, including health and safety issues and a limited shelf life. A94[2:53-55]. Further, there is no way to differentiate between radioactive labels, so, reactions for each nucleotide, A, C, G, or T, had to be analyzed separately. A94-95[2:55-3:5], A90[Fig. 3(II)].

Before the '096 patent was invented, however, scientists had already invented an alternative to radioactivity. On February 22, 1983, Dr. Ruth, a molecular biologist, filed a patent application disclosing a method of making extendible fluorescently-labeled oligonucleotides that retained their functional properties. A149[6:26-28]. Specifically, Ruth '882 disclosed the use of its fluorophore-labeled oligonucleotides as "tools in protocols involving nucleic acid hybridization techniques." A149[6:26-28]. As of 1983, Sanger sequencing was a well-known nucleic-acid hybridization technique that relied on extension. A94[1:61-63]. Unrebutted evidence demonstrates that Dr. Ruth's fluorophore-labeled oligonucleotides were extendible. A11339-91, A18131-32.

After Ruth '882 was filed, Lloyd Smith—an inventor named on the '096 patent—filed an application for a patent that also described fluorophore-labeled oligonucleotides. This application, U.S. Patent Application Serial No. 565,010 ("the '010 application"), was filed on Dec. 20, 1983, and issued as Smith '800. The '010 application, entitled "Synthesis of Amino-Derivitized Oligonucleotides," described Smith's invention as "oligonucleotides conjugated to a detectable moiety which is . . . a fluorescent agent ." A10451, A10459. Smith's application states that: "It is

an object of this invention to provide new reagents and techniques applicable to DNA sequencing. . . . These and other objects and advantages of my invention will be apparent to those skilled in this art . . . ." A10460. Smith '800, which incorporates by reference the entire '010 application, explicitly discloses the use of its fluorophore-labeled oligonucleotides in sequencing techniques: "The materials prepared in this fashion are effective in DNA hybridization methods, as illustrated by their use as primers in DNA sequence analysis." A122[5:51-54].

In addition to explaining that Smith had used his fluorophore-labeled oligonucleotides as sequencing primers, Smith '800 also acknowledged that its invention made automated DNA sequencing possible, and referred to a co-pending, and later filed, patent application for a "DNA sequencing machine," described in Ser. No. 570,973 ("the '973 application"). A121[3:64-68].

Smith and three others filed the '973 application on January 16, 1984. This application, entitled "Automated DNA Sequencing Technique," led to the '096 patent twenty-eight years later. A2509. During the prosecution of the patents and applications that arose from the '973 application, Caltech and Applied Biosystems realized that Charles Connell, an Applied

Biosystems employee, was also an inventor. A2874-77. Caltech explained to the Patent Office that it mistakenly omitted Connell as an inventor, and inventorship on the patent applications in the '096 patent chain was corrected. A2874-77. Connell was never a Caltech employee, and, consequently, never had any obligation to assign rights in his invention to Caltech until long after January 16, 1984. A2874-77.

The invention disclosed in the '096 patent's specification is an application of the chemistry disclosed in Caltech's earlier patents and patent applications, including the '010 application and Smith '800 and '802. A96[6:42-44]. In particular, the disclosed invention is the use of four fluorophore oligonucleotides to allow single-lane, automated sequencing. A90[Fig. 3]. Both the '973 application and the '096 patent state that "[t]he chemistry for the coupling of the . . . fluorophoric tags is described in assignee's copending application Serial No. 565,010." A2519; A96[6:42-44]. This chemistry and its utility in Sanger sequencing was invented by Smith, disclosed in Smith '800, and necessarily predates the invention of the '096 patent. The '096 patent's inventors could not possibly have invented automated DNA sequencing using fluorophore-labeled oligonucleotides until those oligonucleotides had first been invented by Smith. A19835-37.

II. Promega's accused products.

Promega manufactures and sells reagents and kits used for DNA "fingerprinting," which include fluorophore-labeled oligonucleotides. These products determine if two samples of DNA match but do not sequence DNA. They are based on significant advances in the field that occurred during the three-decade prosecution of the '096 patent. Notably, after the invention of the '096 patent, scientists developed the polymerase chain reaction (PCR), which relies not on a single oligonucleotide, but on a pair of oligonucleotide primers. A12622-23. The PCR technique differs from sequencing in that it does not, in and of itself, allow for the determination of the order and identity of nucleotides (A, C, G, and T) in a DNA fragment. A11467-71. Rather, it allows for the rapid generation of copies of discrete regions of DNA found in the human genome. A11467-71. One example of the use of PCR is its application to generate copies of, or "amplify," regions of the human genome that are called "short tandem repeats," or "STRs." A1548-52. The regions are known to be highly variable in length between people. A1548-52.

Beginning in the early 1990s, Promega began to develop the accused products, which rely on PCR amplification of STRs from human genomic

DNA using a pair of oligonucleotides. A1548-52. The PCR reactions generate fluorophore-labeled DNA fragments of particular lengths, which vary between individuals, allowing an individual's DNA to be "fingerprinted." A1548-52. Promega's products are widely used in forensic and paternity applications.

Decades after Caltech filed its first application, Appellants obtained extremely broad claims through reissue of the '748 patent and by successfully advocating for broad claim constructions below. By doing so, Appellants unmoored the claims of the '096 patent from sequencing. This strategy rendered the asserted claims co-extensive with the prior art, including the chemical compound claims of the now-expired Smith '800 and Ruth '882 patents. Appellants cannot rewrite history. Extendible, fluorophore-labeled oligonucleotides were prior art. By discarding their invention of single-lane sequencing, Appellants' attempts to manufacture infringement rendered the asserted claims invalid.

SUMMARY OF THE ARGUMENT

The district court properly entered a judgment of invalidity of the asserted claims. The scope of those claims—most of which are directed to fluorophore-labeled oligonucleotides, hybridized to a complementary

strand of DNA, and extended by polymerase—is not disputed by the parties. Claims 62 and its dependent claims recite the use of these compositions to obtain information about a genetic sequence. Claim 66 is directed to a mixture of fluorophore-labeled oligonucleotides hybridized to a complementary strand of DNA and polymerase. And claim 67 is directed to four sets of fluorophore-labeled oligonucleotides, distinguishably labeled with different fluorophores, which need not be extendible. In short, claim 67 requires nothing more than short DNA fragments labeled with four different colors.

Sanger sequencing was well known in the prior art and relies on extension of an oligonucleotide by polymerase, which is a limitation in all asserted claims except claim 67. The prior art also discloses fluorophore-labeled oligonucleotides with explicit teachings that they should be used as primers in DNA sequence analysis, A122[5:51-54], and as "tools in protocols involving nucleic acid hybridization techniques," A149[6:26-28]. Those skilled in the art knew "nucleic acid hybridization techniques" included DNA sequencing.

Faced with these undisputable facts, the district court properly held that the asserted claims of the '096 patent are invalid as a matter of law.

First, the district court did not err in citing Smith '800 as a § 102(e) reference. As a matter of law and as discussed in detail below, the portion of Smith '800 cited by the district court was not a reference to the '096 patent's inventors' work, but to the work of Smith alone. Additionally, because of the untimeliness of Applied Biosystems and Life's supplemental discovery responses regarding the '096 patent's invention date, the district court did not abuse its discretion by precluding them from relying on an invention date earlier than January 16, 1984. As such, there is no question that Smith '800 was filed before the invention of the '096 patent.

Second, because Smith '800 discloses the same fluorophore-labeled oligonucleotides used in the '096 patent—and discloses their use in Sanger sequencing—Smith '800 anticipates or renders obvious the asserted claims.

Third, Smith '800 renders the asserted claims invalid for ODP. Because Smith '800's claims are directed to compounds and claims of the '096 patent preempt the disclosed utility of those compounds, the district court considered—as it was required to do—Smith '800's specification to determine the proper scope of its claims. Upon consideration of Smith '800's specification and the disclosed use of the

fluorophore-labeled oligonucleotides in Sanger sequencing, invalidity for double-patenting is the only possible conclusion.

Fourth, the asserted claims are rendered obvious by Ruth '882, which explicitly discloses fluorescent oligonucleotides, the specific hybridization of those oligonucleotides, and the use of those oligonucleotides as "tools in protocols involving nucleic acid hybridization techniques." There is no question that those skilled in the art knew that "nucleic acid hybridization techniques" included Sanger DNA sequencing.

Fifth, the district court did not err in holding that claim 62 was invalid for failing to meet the written description requirements of § 112. Claim 62 is invalid because it covers *any* method of sequence analysis that relies upon the extension of an oligonucleotide to generate information about a genetic sequence, but the specification discloses only a single type of sequence analysis, DNA sequencing.

Sixth, the district court was well within its discretion in excluding the testimony of Appellants' damages expert. The expert's proffered reasonable-royalty testimony was arbitrary and inadmissible because he discarded the rate in the most relevant license, the 2006 Cross License, gave no justification as to why the rate on uses outside the Field of Use should

be different than that for uses inside the Field of Use, and arbitrarily considered allegedly comparable licenses with no analysis of technological or economic comparability.

ARGUMENT

I. Standard of Review

Seventh Circuit law applies sanctions under Federal Rule of Civil Procedure 37 and the exclusion of expert testimony. *Duramed Pharms., Inc. v. Watson Labs., Inc.*, 413 Fed. App'x. 289, 297 (Fed. Cir. 2011); *Microstrategy Inc. v. Business Objects, S.A.*, 429 F.3d 1344, 1356-58 (Fed. Cir. 2005). The Seventh Circuit reviews an entry of sanctions under Rule 37 for an abuse of discretion. *Golant v. Levy*, 239 F.3d 931, 937 (7th Cir. 2001).

II. Smith '800 anticipates or renders obvious the asserted claims.

Smith '800 discloses the same fluorophore-labeled oligonucleotides used in the '096 patent. A96[6:42-44], A19835-37. Smith '800 also discloses the "effective" use of those compounds "as primers in DNA sequence analysis." A122[5:51-54]. According to inventor Smith, "use as primers in DNA sequence analysis" is an explicit reference to the use of the fluorophore-labeled oligonucleotide in "sequencing reactions" that comprise the critical steps of Sanger sequencing. A19787-90. The reference

to "use as primers in DNA sequencing" therefore discloses the well-known steps of Sanger sequencing, including specific hybridization of an oligonucleotide to a complementary strand of DNA, extension of that oligonucleotide by polymerase, and separation of the extended oligonucleotide from the complementary strand of DNA. A5787-88,A11638-40. These steps correlate to the limitations of the asserted claims and the district court correctly held that Smith '800 anticipates claim 62, its dependents, and claim 66.

Appellants do not really contest that disclosure of the use of Smith '800's fluorophore-labeled oligonucleotides in Sanger sequencing would anticipate or render obvious the asserted claims. Instead, they argue that Smith '800 is not prior art under 35 U.S.C. § 102(e) and Smith '800's reference to "use as primers in DNA sequence analysis" is not necessarily a reference to Sanger sequencing. These arguments fail in law and fact, and claim 62, its dependents, and claim 66 are anticipated by Smith '800. As additional grounds for affirmance, which the district court did not address, Smith '800 must render the asserted claims, including claim 67, obvious.

A. The district court properly considered Smith '800 as prior art.

The district court did not err in considering Smith '800 as prior art to the '096 patent under § 102(e) because the invention disclosed therein was invented "by another," and the invention date of the asserted claims is after Smith '800's effective filing date. The focus of Appellants' argument on this point is their assertion that the district court relied on material from Smith '800 that was a reference to the '096 patent's invention. Aside from being factually incorrect, as illustrated below, Appellants' argument requires that the invention date of the '096 patent precede the filing date of Smith '800. But this premise was foreclosed when the district court properly sanctioned Appellants, precluding them from relying on an invention date before January 1984.

1. Appellants do not dispute that Smith '800 was "by another."

To qualify as prior art under § 102(e)[3] the reference patent must have been by one who is legally "another." 35 U.S.C. § 102(e). The seminal case interpreting "by another" is *In re Land*, 368 F.2d 866 (C.C.P.A. 1966), authored by Chief Judge Giles S. Rich. In *Land*, the court held that a patent

[3] All references to § 102 are to the pre-America Invents Act version of that section.

naming Land as the sole inventor, and a patent naming Rogers as the sole inventor, were prior art to an application naming both Land and Rogers as joint inventors. *Id.* at 880. Judge Rich reasoned that "A" is a different legal entity than joint applicants "A and B," and "another" simply means "other than the applicant." *Id.* at 876-78. The inventive entity is different where not all inventors are the same, and the sole work of one person may be used as prior art against the joint work of that person with another. *Id.*; MPEP § 2136.04.

The conclusion that Smith '800 is "by another" is a straightforward application of this rule of law. Appellants do contest that the asserted claims were invented by the five inventors named on the '096 patent, Smith, Hood, M. Hunkapiller, T. Hunkapiller, and Connell. The inventors on Smith '800 were Smith and two others, neither of whom is named as an inventor on the '096 patent. A119. Further, the '010 application, which was the first in a chain of continuation and divisional applications leading to Smith '800, named Smith as the sole inventor. A10451. Accordingly, Appellants cannot and do not contest the conclusion that Smith '800 was "by another." *See* Defendants-Appellants' Opening Br. ("Opening Br.") 26-27.

2. The district court properly relied on Smith '800's disclosure of the utility of its claimed compounds to invalidate the asserted claims.

The district court correctly relied on Smith '800's disclosure of its fluorophore-labeled oligonucleotides being used in Sanger sequencing because that was Smith's invention, not that of the '096 patent's inventors.

The invalidating portions of Smith '800 are not references to the '096 patent's inventors' work, but to the work of Smith alone. The district court relied on column 5 lines 51-54 from Smith '800 to invalidate the asserted claims, A67-70: "The materials prepared in this fashion are effective in DNA hybridization methods, as illustrated by their use as primers in DNA sequence analysis." A122[5:51-54]. Appellants' assertion that this is a reference to the work of the inventors of the '096 patent is unsubstantiated. The reference does not mention the work of the '096 patent's inventors. Neither does it refer to any application leading to the '096 patent.

Although Smith '800 does refer to the '096 patent's application, that reference is to "a DNA sequencing machine" and "the *automation* of the DNA sequencing process." A121[3:64-68] (emphasis added). This reference to the '096 patent is to a specific improvement using Smith '800's compounds, namely their use in automated DNA sequencing. Unlike that

disclosure in column 3, the disclosure at column 5 is a reference to Smith's work—and Smith's alone—of inventing fluorophore-labeled oligonucleotides that he knew were useful as primers in DNA sequencing.

Smith's '010 application, the entirety of which is incorporated into Smith '800, *see Harari v. Lee*, 656 F.3d 1331, 1335 (Fed. Cir. 2011), A120[1:13-15], confirms this conclusion. After describing properties of "[t]he single stranded oligonucleotides of this invention," the '010 application describes "[s]ynthetic oligonucleotides" "as primers for DNA synthesis on a single-stranded template," which is a reference to Sanger sequencing. A10455, A10467. The '010 application specifically discloses the use of Smith's fluorophore-labeled oligonucleotides in DNA sequencing, stating that: "It is an object of this invention to provide new reagents and techniques applicable to DNA sequencing. . . . These and other objects and advantages of my invention will be apparent to those skilled in this art . . . ." A10460. None of these references to primers for DNA synthesis, or to DNA sequencing, mention the '096 patent's priority application, or the work of the '096 patent's inventors.

Appellants wrongly assert, Opening Br. 23 n.8, that a Promega expert "admitted" that column 5's discussion of "primers" and "sequence

analysis" refers to the '096 patent's inventors' work. Promega's expert, in fact, wrote that Smith '800 discloses the use of the fluorophore-labeled oligonucleotides in sequencing methods:

> The '800 Patent *establishes* that modified oligonucleotides, including fluorescently-labeled oligonucleotides, would be useful in DNA sequencing reactions in particular provided they retained the characteristics necessary of a "primer" as disclosed in the '096 patent—a free 3' hydroxyl group, hybridization to a complementary sequence to form a stable duplex, and the modifying moiety does not interfere with hybridization or extendibility by a polymerase.

A11271 (emphasis added). According to Promega's expert, the "'800 patent establishes" the use of fluorophore-labeled oligonucleotides in DNA sequencing reactions. The reference to the '096 patent is simply a reference to the required characteristics of a primer that are enumerated in that patent. In other words, Promega's expert explained that because Smith '800 discloses the use of Smith's fluorophore-labeled oligonucleotides in DNA sequencing reactions, those fluorophore-labeled oligonucleotides necessarily possess the required characteristics of sequencing primers, which are disclosed in the '096 patent. A96[5:66-6:6].

Appellants' argument is contradicted by Judge Rich's analysis in *Land*. The *Land* court upheld the rejection of an application that named

Land and Rogers as co-inventors. In doing so, the court relied, in part, on a reference patent to Rogers alone. The Rogers patent referred to the Land and Rogers application and to the application's general subject matter. *Land*, 368 F.2d at 880. Nevertheless, the court upheld the board's reliance on the Rogers patent as prior art, because the Rogers's reference to the application of Land and Rogers was not "any part of the disclosure relied on to support the obviousness rejection." *Id.*

This same analysis applies here. Smith '800 does contain "a general description of and cross-reference to the subject matter" of the '973 application at column 3 lines 64-68, but this reference did not form any part of the disclosure relied on by the district court to support its finding of anticipation. A67-70. The district court properly determined that Smith '800 was an anticipatory reference based on the disclosure in column 5, which refers to the work of Smith alone.

3. Nothing in the record suggests that the asserted claims were invented before Smith '800's priority date.

Appellants point to no evidence supporting their assertion that the invention of the '096 patent predates the effective filing date of Smith '800. Smith's Rule 131 declaration does not state that "the inventors" had

conceived of and reduced to practice the subject matter of the invention before the filing of Smith '800. Rather, Smith's declaration states: "I conceived and reduced to practice oligonucleotide primers labeled with fluorescent dyes in the United States prior to December 20, 1983. The fluorescent dye labeled oligonucleotide primers were used in DNA sequencing reactions in the United States prior to December 20, 1983." A4497. The declaration refers only to Smith's activities and says nothing about when the '096 patent's inventors invented the '096 patent's claims. This additionally supports the conclusion that the use of fluorophore-labeled oligonucleotide primers in sequencing was Smith's invention, not that of the '096 patent's inventors.

4. Appellants were properly precluded from asserting an invention date earlier than January 16, 1984.

The district court properly precluded Appellants from asserting an invention date earlier than January 16, 1984, because Appellants maintained this invention date until 11:58 p.m. on the last day of discovery. This was after Promega served its summary judgment motion based on the 1984 invention date. Eight months before Appellants' attempted supplementation, Promega asked Appellants, in an interrogatory, to state

the invention date. A16352-62. Applied Biosystems and Caltech[4] responded that the invention date was January 16, 1984. A14402-08. Appellants' expert, Dr. Norman Dovichi also opined that January 16, 1984, was the "invention date" of the '096 patent. A11667.

Parties are under a duty to supplement their responses to discovery requests in a timely manner if they learn that their responses are, in some material respect, incomplete or incorrect. Fed. R. Civ. Pro. 26(e) (1)(A). Here, Appellants do not even contest the untimeliness of the supplementation. This is unsurprising given that the attempted supplementation occurred during the last two minutes of discovery, seven months after the original discovery responses were due, and based entirely on materials that have been in Appellants' possession since before this lawsuit was filed.[5] A16352-76. Indeed, collectively, Appellants have had the information for thirty years.

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[4] Applied Biosystems responded to the interrogatory before Life was a party.

[5] Appellants relied on inventor testimony from a previous litigation, laboratory notebooks from the 1980s, file histories, and Caltech's 30(b)(6) witness's ad hoc interpretation thereof, to try and claim an earlier date. A16366-76.

Any party who fails to amend an interrogatory response under Rule 26(e) is not, unless such failure is harmless, permitted to use as evidence the information disclosed. Fed. R. Civ. P. 37(c) (1). "[T]he sanction of exclusion is automatic and mandatory unless the sanctioned party can show that its violation" of Rule 26 was "either justified or harmless." *Salgado v. Gen. Motors Corp.*, 150 F.3d 735, 742 (7th Cir. 1998); *see also Tribble v. Evangelides*, 670 F.3d 753, 759 (7th Cir. 2012). The determination of whether a failure to supplement is harmless or justified is left to the broad discretion of the district court, which need not make explicit findings regarding harmlessness or justification. *David v. Caterpillar, Inc.*, 324 F.3d 851, 857 (7th Cir. 2003).

Appellants' belated supplementation was unjustified. They knew for nearly a year that Promega intended to rely on Smith '800, which has a priority date of December 1983, and on Ruth '882, which has a priority date of February 1983, as prior art. A16344-50, A16364. The deadline for Appellants' discovery response was long past. And the information in the supplemental response had long been in Appellants' possession.

Appellants' belated supplementation harmed Promega. To determine whether failure to comply with Rule 26 was harmless, courts must take into account:

> (1) the prejudice or surprise to the party against whom the evidence is offered; (2) the ability of the party to cure the prejudice; (3) the likelihood of disruption to the trial; and (4) the bad faith or willfulness involved in not disclosing the evidence at an earlier date.

Tribble, 670 F.3d at 760 (quoting *David*, 324 F.3d at 857.

Promega was both surprised and prejudiced by the supplementation. There was no suggestion that Appellants intended to allege an earlier invention date before 11:58 p.m. on the last day of discovery. By then, Promega had completed more than a dozen expert reports, A295-96, A302, A308-10, many of which relied on the 1984 invention date. All expert and fact depositions had been completed, including inventor depositions. And Promega had moved for summary judgment of invalidity based in part on the '800 and '882 patents. A14347-48, A14403-04, A14407-08. At two minutes to midnight, there was no time to re-visit fact or expert discovery. Nor was there time to investigate why Caltech—the party with the most knowledge of the invention date—did not attempt to assert an earlier date. A literal last-minute supplementation in an effort to change a key fact on

which Promega relied—after Promega's strategy had been completely revealed to Appellants—is an extreme example of prejudice and surprise.

Promega could not cure the prejudice without reopening discovery and delaying trial, which was set to start in only six weeks. And there is no other reason but willfulness and bad faith to explain the belated supplementation.

Appellants' argument that it cannot have "waived" "the ability to identify the truth" as to the '096 patent's date of invention fails. Smith '800's mere reference to a patent application that *eventually* issued as the '096 patent cannot remove Smith '800 as a § 102(e) reference. A reference to a yet-to-be-filed patent application and its general subject matter does not establish the invention date of the unfiled application. *Land*, 368 F.2d at 880. Additionally, the district court did not find that Appellants *waived* their ability to assert an earlier invention date. A58. Rather, the district court *sanctioned* Appellants by precluding them from relying on an earlier invention date.[6] This sanction was both mandatory and automatic under Rules 26 and 37.[7]

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[6] Appellants' suggestion that the district court conflated the priority date under 35 U.S.C. § 120 with the date of invention, Opening Br. 32, is a

This sanction also precludes Appellants from asserting their argument that the invalidating disclosure in Smith '800 is a reference to the '096 patent's inventors' work. Appellants' argument is premised on the '096 patent's invention date being before Smith '800's effective filing date in December 1983. But, because of the sanction, they cannot argue that the '096 patent's invention date was before January 1984. Appellants' suggestion that the anticipatory disclosures in Smith '800 are references to the '096 patent's invention must be rejected.

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red herring. Although the district court mentioned Appellants' arguments regarding the '096 patent's priority date, the district court's reasoning was based on Appellants' responses to Promega's interrogatories concerning the date of invention.

[7] Had the supplemental response not been stricken, and had discovery been reopened, Promega would have asserted Smith '800 as prior art under § 102(g). The '096 patent itself states that it is an improvement to the invention disclosed in the '010 application, which resulted in Smith '800. The fluorophore-labeled oligonucleotides of Smith '800 necessarily predated the '096 patent's invention.

B. Smith '800 anticipates, or renders obvious, the asserted claims of the '096 patent.

Because undisputed facts demonstrate that Smith '800 discloses each and every element of claim 62, its dependents, and claim 66, the district court properly entered summary judgment invalidating those claims. The district court did not address Promega's argument that Smith '800 renders the asserted claims obvious, A60-79, A14360-63, so that argument provides alternative grounds for affirmance of the judgment of invalidity.

1. *Each and every element of claim 62 (and its dependents) and claim 66 is disclosed in Smith '800.*

Smith '800 discloses the same fluorophore-labeled oligonucleotides that are disclosed and claimed in the '096 patent. Moreover, Smith created those oligonucleotides for the purpose of using them in Sanger sequencing. Unsurprisingly, Smith '800 discloses this exact utility and anticipates claim 62, its dependents, and claim 66. "Under 35 U.S.C. § 102 a claim is anticipated if each and every limitation is found either expressly or inherently in a single prior art reference." *King Pharm., Inc. v. Eon Lab., Inc.*, 616 F.3d 1267, 1274 (Fed. Cir. 2010) (quotation marks omitted). Anticipation "does not require actual performance of suggestions in a disclosure" but "only requires that those suggestions be enabling to one of skill in the art."

Bristol-Myers Squibb Co. v. Ben Venue Labs., 246 F.3d 1368, 1379 (Fed. Cir. 2001) (citation omitted).

The district court based its finding of anticipation on undisputed facts that remain uncontested. The Sanger method was invented in 1977 as a way to determine the order and identity of nucleotides in a target strand of DNA. A94[1:61-65]. It was one of "[t]wo DNA sequencing methods . . . in widespread use." A94[1:61-62]. The district court's description of Sanger sequencing is consistent with that given above, and with that given by Appellants' expert, Dr. Dovichi. A66-67, A11638-40. Accordingly, the key features of Sanger sequencing, e.g., specific hybridization and extension by polymerase, and the conclusion that "[a] person skilled in the art . . . would be familiar with the steps of [the Sanger] method," A66-67, cannot be contested by Appellants and is consistent with their numerous descriptions of Sanger sequencing, *see, e.g.*, A5787-88.

Smith '800 discloses the use of its fluorophore-labeled oligonucleotides in Sanger sequencing. More specifically, it discloses the chemical structure of a linker arm and the use of that linker to attach a fluorophore to an oligonucleotide. A119[Abstract], A122[5:56-6:34]. And it states that the disclosed fluorophore-labeled oligonucleotides "are

effective . . . as primers in DNA sequence analysis." A122[5:52-54]. As the '096 patent makes clear, there were only two types of sequencing reactions in the art, Sanger and Maxam-Gilbert. A94[1:61-2:41]. Of those two methods, only Sanger sequencing employs primers. A94[1:61-2:41]. And Appellants point to no evidence to suggest that the reference to primers from column 5 in Smith '800 refers to anything other than Sanger sequencing reactions. As the district court reasoned, this statement must refer to Sanger sequencing.

Smith himself agrees. Smith testified extensively that the disclosure in column 5 refers to the use of Smith '800's fluorophore-labeled oligonucleotides in sequencing reactions, and that these reactions comprised all of the central steps of Sanger sequencing. For example, when asked if the disclosure in column 5 referred to a "sequencing reaction [that] would have had a fluorescent oligonucleotide," Smith answered, "Basically, that seems to agree with what's written down here." A14617-18. The rest of Smith's testimony, which was also relied upon by the district court, A66, confirms that the reference in column 5 of Smith '800 was a reference to Sanger sequencing. Smith explained that using "primers in DNA sequence analysis" referred to sequencing reactions that comprised: a

fluorophore-labeled oligonucleotide primer; a complementary strand of DNA; free unincorporated deoxynucleotides; dideoxynucleotides; and polymerase. A14617-18. These elements comprise all of the central features of Sanger sequencing. *See* A11638-40. Thus, Smith '800's reference in column 5 to the "use of primers in DNA sequence analysis" must be a reference to the use of Smith's fluorophore-labeled oligonucleotides in Sanger sequencing.

Smith's prior testimony and the testimony of Leroy E. Hood, a named inventor on the '096 patent, also confirm this understanding. In 2002, Smith testified, "I think it would be difficult to do Sanger sequencing without a primer, and in order to have a primer, the primer has to bind to the template and the three prime end has to be extended by the polymerase." A18244-45. Accordingly, not only did Smith testify that Sanger sequencing requires primers, he also testified that the use of primers requires hybridization to a template and extension by a polymerase. The reference in column 5 of Smith '800 to fluorophore-labeled oligonucleotides and their effective "use as primers" is therefore a short-hand reference well-understood to refer to Sanger sequencing and to disclose the hybridization of an oligonucleotide to a template and extension by polymerase at the

primer's 3' end, which are core steps in Sanger sequencing and limitations in the asserted claims.

Similarly, Hood testified that the cited language from column 5 refers to the use of Smith '800's fluorophore-labeled oligonucleotide in "DNA *sequencing* as illustrated by their use as primers in sequence analysis." A16469 (emphasis added). The undisputed facts and clear admissions by Smith and Hood prove that column 5's reference to "use as primers" in "DNA sequence analysis" refers to Sanger sequencing.

a. Claim 62 and its dependents are anticipated by Smith '800.

Because Smith '800 discloses fluorophore-labeled oligonucleotides that are effective in Sanger sequencing, it discloses each and every element of claim 62. Claim 62 reads:

> A method of nucleic acid sequence analysis, comprising extending an oligonucleotide along a complementary strand of DNA of a duplex by a polymerase to produce a labeled extension product, wherein the duplex comprises the oligonucleotide specifically hybridized to the complementary strand of DNA, and wherein the oligonucleotide is covalently coupled to a fluorophore so as to allow chain extension by the polymerase.

Smith '800 discloses an "oligonucleotide . . . covalently coupled to a fluorophore." A119[Abstract], A137[35:1-36:35]. The other elements of

claim 62 are disclosed by Smith '800's reference to use of fluorophore-labeled oligonucleotides in Sanger sequencing. Column 5 states that the fluorophore-labeled oligonucleotides are effective for use in DNA sequence analysis, fulfilling the preamble's limitation. And, as Smith testified, Smith '800's reference to effective use as primers in sequencing requires hybridization to a complementary strand of DNA, formation of a duplex, and extension by polymerase, thereby creating a labeled extension product. A14617-18. Appellants' expert's description of Sanger sequencing also includes each of these elements. A11638-40. The district court recognized that Appellants could not and did not contest any of this, A68, and it correctly concluded that Smith '800 anticipates claim 62.

Smith '800's disclosure of "effective" primers enables the reference for anticipation purposes. Material in a prior art patent, both claimed and unclaimed, is presumed enabled. *Amgen Inc. v. Hoechst Marion Roussel*, 314 F.3d 1313, 1355 (Fed. Cir. 2003). Appellants pointed to nothing below, and can point to nothing now, that would overcome this presumption. Upon reading Smith '800's disclosure of effective fluorophore-labeled primers, a person of ordinary skill could have simply replaced radioactive primers with a single-colored primer and performed Sanger sequencing, albeit in

four lanes, instead of one. No evidence suggests otherwise. DNA sequencing using the Sanger method, developed in the 1970s, was certainly enabled to a person of skill in the art as of January 16, 1984, and that method was well-known to require both extension and specific hybridization.

Promega's enablement arguments are not to the contrary. Promega never argued that four-lane sequencing with a single-color fluorophore-labeled oligonucleotide was not enabled by the '096 patent. Instead Promega argued that the full scope of the claims was not enabled—for example, Promega was prepared to present evidence at trial that single-lane sequencing with four, colored-oligonucleotides was not enabled.

There is no inconsistency between these § 112 positions and Promega's anticipation arguments. It is hornbook patent law that:

> [t]here is also a distinction between claim-anticipating disclosures and claim-supporting disclosures. A description of a single embodiment of broadly claimed subject matter constitutes a description of the invention for anticipation purposes, whereas the same information in a specification might not alone be enough to provide a description of that invention for purposes of adequate disclosure.

Robert L. Harmon, et al., *Patents and the Federal Circuit* § 3.2(c) (10th ed. 2011); *see also Chester v. Miller*, 906 F.2d 1574, 1576-77 (Fed. Cir. 1990). Put

another way, to anticipate a claim a reference need only disclose one embodiment, but one embodiment is not necessarily sufficient to meet the enablement and description requirements of § 112. Such is the case here: Smith '800 enables four-lane sequencing with a single, colored oligonucleotide, thereby anticipating claims of the '096 patent. But that single embodiment is not sufficient to describe and enable the broad scope of the '096 patent's claims, which include single lane sequencing.

Dr. Dovichi's expert report raises no issues of fact. He does not even say that any claim element is missing. Appellants' expert's entire analysis of invalidity in view of Smith '800 is:

> This patent discloses the synthesis of modified oligonucleotides that contain a primary amine attached to the sugar moiety of a mononucleotide. Smith '800 patent discloses that this primary amine may then modified (sic) by covalently attaching a fluorescent dye. While the Smith '800 patent mentions the possible use of these oligonucleotides in DNA sequencing, this offhand comment does not enable one with ordinary skill to hybridize the labeled oligonucleotide to a complementary sequence or to then extend the oligonucleotide by a polymerase.

A11670. Dr. Dovichi admits that Smith '800 discloses using fluorescent oligonucleotides in DNA sequencing methods. His only argument is that sequencing is not enabled but he provides no analysis and his bare

assertion of non-enablement does not overcome the presumption of enablement to which Smith '800 is entitled. *See Amgen*, 314 F.3d at 1355.

Appellants are also wrong when they claim that "neither of Promega's two invalidity experts were willing to opine that Smith '800 anticipated." Opening Br. 31. Dr. Ruth reviewed and incorporated-by-reference Promega's invalidity contentions into his expert report. A11277. The invalidity contentions explained precisely how and why each limitation of the asserted claims is disclosed in Smith '800. A7878-82, A16349-50. Further, Dr. Ruth testified, in no uncertain terms, that Smith '800 anticipates the asserted claims. A18130. Appellants challenged the admissibility of Dr. Ruth's testimony, but the district court denied their Daubert motion. A60-61. Appellants have not appealed from that ruling. Further, where expert testimony supporting anticipation is required (it is not always required), the "expert testimony may be critical, for example, to establish the existence of certain features in the prior art." *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1240 n.5 (Fed. Cir. 2010) (citations omitted). Dr. Ruth did just that—he opined on the disclosures in Smith '800. A11271-73.

The asserted claims that depend from claim 62 are likewise anticipated by Smith '800. Sanger sequencing requires that the labeled

oligonucleotides be separated from the duplex, as required by claim 63. The linker arms in Smith '800 are amine linkages, as required by claim 65. A11654. Further, the linker arms connect a single fluorophore to a single nucleotide at the 5' terminal end of the oligonucleotide, thereby providing the additional limitations of claims 70, 74, 80, 86, 92, and 98. A11654, A11670.

b. Claim 66 is anticipated by Smith '800.

Claim 66 recites:

> A mixture comprising a polymerase and a duplex, wherein the duplex comprises an oligonucleotide specifically hybridized to a complementary strand of DNA, wherein the oligonucleotide is covalently coupled to a fluorophore so as to allow chain extension by the polymerase.

Smith '800 discloses an "oligonucleotide . . . covalently coupled to a fluorophore so as to allow chain extension by the polymerase." The remaining limitations, as discussed above, are provided by the disclosure that the fluorophore-labeled oligonucleotides are effective for use as primers in Sanger sequencing. As the district court correctly reasoned, claim 66 is the mixture that results when claim 62 is performed. Because Smith '800 discloses performance of method claim 62, claim 66 is anticipated as well.

2. Smith '800 also renders the asserted claims obvious in light of the knowledge of a person of ordinary skill in the art.

Even if Appellants were correct and Smith '800 did not anticipate the asserted claims, Smith '800's disclosure of effective use as primers in DNA sequence analysis would render the claims obvious. Although the district court held that § 103(c)'s safe-harbor does not apply to Smith '800 and that the patent was a § 103 reference, A65-66,[8] the court did not rule on Promega's motion for summary judgment of obviousness based on Smith '800. Accordingly, holding that the asserted claims are obvious in view of Smith '800 provides alternative grounds for affirmance of the district court's opinion of invalidity.

Summary judgment of obviousness under 35 U.S.C. § 103 is appropriate where "the content of the prior art, the scope of the patent claim, and the level of ordinary skill in the art are not in material dispute, and the obviousness of the claim is apparent in light of these factors." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007). Claims are obvious under

[8] Appellants do not challenge the district court's holding that the § 103(c) safe-harbor does not apply here. Because Charles Connell was an Applied Biosystems employee in January 1984, with no obligation to assign to Caltech, and because no joint research agreement between Caltech and Applied Biosystems exists, § 103(c) cannot apply. A65-66.

35 U.S.C. § 103(a) if, at the time of the invention, "the combined teachings of the prior art, taken as a whole, would have rendered the claimed invention obvious to one of ordinary skill in the art." *In re Napier*, 55 F. 3d 610, 613 (Fed. Cir. 1995). The test for obviousness requires four factual inquiries: (1) the scope and content of the prior art; (2) the differences between the asserted claims and the prior art; (3) the level of ordinary skill in the art; and (4) secondary considerations of nonobviousness, if present. *KSR*, 550 U.S. at 406-07 (citing *Graham v. John Deere Co. of Kansas City*, 383 U.S.1, 17-18 (1966)).

The motivation to combine references or disclosures "need not be found in the references sought to be combined, but may be found in any number of sources, including common knowledge, the prior art as a whole, or the nature of the problem itself." *Dystar Textilfarben GH & Co Deutschland KG v. C.H. Patrick Co.*, 464 F.3d 1356, 1361 (Fed. Cir. 2006). "A person of ordinary skill is also a person of ordinary creativity, not an automaton." *KSR*, 550 U.S. at 421.

Appellants' argument that Smith '800 does not anticipate the asserted claims reduces to one proposition: Smith '800's reference to "effective . . . use as primers in DNA sequence analysis" does not necessarily indicate

Sanger sequencing. Aside from being incorrect, this proposition is irrelevant to the resolution of this case because even if the reference was not to Sanger sequencing, it would render the use of Smith '800's primers in Sanger sequencing obvious, thereby rendering claim 62, its dependents, and claim 66 obvious. This conclusion follows from the evidence discussed regarding anticipation by Smith '800. Persons skilled in the art knew that Sanger sequencing was a type of sequence analysis. Smith '800's disclosure of the "effective . . . use" of its fluorophore-labeled primers "in DNA sequence analysis" provided a clear suggestion to use the primers in Sanger sequencing.

Smith '800 also renders claim 67 obvious. Claim 67 requires a composition with four sets of oligonucleotides, each with a different type of fluorophore attached. The claim is not limited to any function or particular use of the mixture. Nor does claim 67 require extension, hybridization, or polymerase, so it is remarkably broad.

To the extent that Smith '800 does not explicitly disclose a composition with four distinguishably labeled oligonucleotides, it would be obvious to one of skill in the art to use multiple, fluorescent labels—four

in particular—given the teachings of Smith '800 specification to use the oligonucleotides as sequencing primers.

In two columns, Smith '800 discloses an oligonucleotide. A137[35:1-33]. It discloses that the oligonucleotide can be labeled with a fluorophore. A137[35:1-33]. And it discloses numerous fluorophores, including fluorescein-5-isothiocyanate, Texas Red, Lucifer Yellow and tetramethyl rhodamine isothiocyanate, A137[35:66-36:35], all of which Smith testified were distinguishable from one another. A14618-20. Moreover, Appellants' expert, Dr. Dovichi, explains the ease with which different fluorophores could have been used: "The use of an alternative fluorescent label is a simple modification that would have been well within the ability of a person of ordinary skill in the art."A12621. And he named four specific fluorophores that are distinguishable from one another. A12620-21.

Smith '800 therefore discloses oligonucleotides that could be labeled with four different types of fluorophores; the only remaining question is whether it would have been obvious to combine those four fluorophores into a single composition. It would have.

A person of ordinary skill would have been well motivated to use multicolored labeled oligonucleotides, thereby mixing four sets, or more, of

fluorophore-labeled oligonucleotides together. As set forth in Promega's invalidity contentions and Dr. Ruth's expert report, several references, such as, Tsuchiya, et al., explained the benefits of using multicolor labeling in sequence analysis methods. A7880, A11268-70. Tsuchiya, et al., wrote in 1982, "If multicolored labeling is possible, a great deal of information can be collected via a single analysis channel." A17188-90. In 1983, Tsuchiya reiterated that fluorescence labeling confers the ability to use multiple dyes or fluorophores and that such multicolor labeling would allow the measurement of "a plurality of samples" on a single lane of a gel. A17196, A17202.

Finally, as the district court noted at length, the existence of four different nucleotides in DNA suggests a purpose for four independent signals to be measured. *See Dystar*, 464 F.3d at 1361 (stating that the nature of the problem itself can provide motivation to combine). This incontrovertible fact is more than sufficient to provide motivation to combine. Smith '800 renders claim 67 obvious. *See, e.g.*, *Boston Scientific Scimed, Inc. v. Cordis Corp.*, 554 F.3d 982, 991 (Fed. Cir. 2009).

Appellants produced no real evidence of objective indicia of non-obviousness. They did not raise the issue until their reply brief in support

of their motion of non-obviousness. In that brief they cited three objective indicia: the number of patents received by the inventors; the inventors' reputation; and awards received by the inventors. A17009-10. In their opening brief, Appellants address none of these supposed indicia, instead suggesting "evidence" of long-felt need and copying by Promega. But Appellants put forward no such evidence. Their attempt to do so, through their expert Dr. Dovichi, failed when the district court excluded his testimony regarding copying and commercial success, a ruling from which Appellants do not appeal. A48-49. Appellants have no evidence of objective indicia and the district court did not err in so finding.

III. Obviousness-type double-patenting renders the asserted claims invalid in view of Smith '800.

A. The asserted claims are not patentably distinct from Smith '800's claims.

ODP prevents unwarranted extensions of patent term based on an inventor's serial patenting of obvious variants of an invention. ODP bars a patentee who claims a compound and discloses a use of that compound in a first patent from later claiming that method of use in a second patent. Smith '800 claims oligonucleotides having amine linkers and discloses those linkers as being useful to attach fluorophores for use in Sanger

sequencing. A119[Abstract], A122[5:51-6:34], A144[49:66-52:8], A11654. Smith '802 claims the use of those linkers in fluorophore-labeled oligonucleotides. A197[53:45-54:2]. The asserted claims of the '096 patent cover methods and mixtures of fluorophore-labeled oligonucleotides, with additional limitations well-known from, and required by, the disclosed use of those compounds in Sanger sequencing. Claiming the use of fluorophore-labeled oligonucleotides to hybridize to a complementary strand of DNA and extend in the presence of a polymerase, for instance, adds nothing to Smith '800's disclosure of their use in Sanger sequencing. Appellants should not be permitted to extend their monopoly on the chemistry, the linkers, to 2018—thirty-four years after Smith '800 was filed.

"[W]here a patent features a claim directed to a compound, a court must consider the specification because the disclosed uses of the compound affect the scope of the claim for obviousness-type double patenting purposes." *Sun Pharm. Indus. v. Eli Lilly & Co.*, 611 F.3d 1381, 1387 (Fed. Cir. 2010). This is because

> [i]t would shock one's sense of justice if an inventor could receive a patent upon a composition of matter, setting out . . . the useful purposes of such composition . . . and then prevent the public from making any beneficial use of such patent by

> securing patents upon each of the uses to which it may be adapted.

Eli Lilly v. Teva Parenteral Meds., Inc., 689 F.3d 1368, 1379 (Fed. Cir. 2012) (quotation marks omitted). Because this is the situation here, the utility disclosed in Smith '800 must be considered when comparing the claims of the '096 patent to the claims of Smith '800.

Comparing the claims of Smith '800 to the asserted claims of the '096 patent compels the conclusion that ODP invalidates the latter. Smith '800's claims are directed to oligonucleotides with amine linkages. To understand the scope of these compound claims, the uses disclosed in the specification must be considered. *See Sun Pharm.*, 611 F.3d at 1387. As discussed above regarding §§ 102 and 103 invalidity, Smith '800 discloses the use of its fluorophore-labeled oligonucleotides in Sanger sequencing. For ODP purposes, then, the scope of Smith '800's claims includes the use of its fluorophore-labeled oligonucleotides in Sanger sequencing. The asserted claims overlap with this claim scope: claims 62 and its dependents cover the use of Smith '800's compounds in Sanger sequencing, claim 66 covers mixtures that necessarily result from that use in Sanger sequencing (claim 66), and claim 67 covers compositions that are obvious in view of the use of

Smith '800's compounds in Sanger sequencing. The asserted claims are not patentably distinct from Smith '800's claims.

In this respect, ODP tracks the §§ 102 and 103 analysis above. In fact, in some situations, ODP is easier to establish than § 103 obviousness because ODP does not require consideration of the motivation to combine prior art or objective criteria suggesting non-obviousness. *See Geneva Pharm. Inc. v. Glaxosmithkline PLC*, 349 F.3d 1373, 1378 n.1 (Fed. Cir. 2003).

Smith '802's claims underscore the invalidity of the '096 patent claims. Smith '802's claims cover the amine-linked oligonucleotides claimed in Smith '800 coupled to different fluorophores. Smith '802's specification likewise discloses that these claimed compounds are effective for "use as primers in DNA sequence analysis." A174[8:13-15]; *see Sun Pharm.*, 611 F.3d at 1387. Thus, like Smith '800's claims, Smith '802's claims also render the asserted claims invalid under ODP. But Smith '802's claims render the '096 patent claims obvious in other ways. For example, claim 67 of the '096 patent only requires four fluorophore-labeled oligonucleotides, but claim 1 of Smith '802 recites more than eight fluorophores that could couple to an oligonucleotide. A14619-20. Given the properly interpreted scope of Smith '802's claims, the asserted claims should be held invalid for ODP.

Appellants argue that Smith '800's specification should not be considered because it is a reference to the '096 patent's inventors' work. Opening Br. 40. The argument is factually incorrect, because, as detailed above, Smith '800's reference to the "effective use" of its claimed compounds in "DNA sequence analysis" is a reference to Smith's own use of the primers in sequencing, not the '096 patent's inventors' work. But even if Appellants were correct on the facts, the disclosed utility of the amine-linkers must still be considered to understand the scope of the claims. The scope of Smith '800's claims do not depend on who invented what because the disclosed utility informs the "scope of the [compared] claim" regardless of the inventorship of the disclosed utility. *See Sun Pharm. Indus.,* 611 F.3d at 1387-88 (specification as issued not specification as filed must be considered regarding ODP analysis). Appellants' argument has no basis in fact or law and should be rejected.

Appellants' citation to *In re Kaplan*, 789 F.2d 1574 (Fed. Cir. 1986) is unavailing. There, the reference patent recited process claims, not compound claims. *Id.* at 1574-75. Accordingly, the holding in *Kaplan* simply stands for the unsurprising proposition that where the reference patent's

claims are not directed to compounds, its specification should not be considered. *Kaplan* is not relevant to the ODP analysis here.

ODP applies to claims that share even one common inventor. *In re Hubbell*, 709 F.3d 1140, 1148 (Fed. Cir. 2013). Appellants' suggestion that this Court consider the specific inventive entity of the disclosed reference would require the complex dissection of the specification into particular inventive entities and then mapping disclosures to particular claims. The law governing ODP has never required such a convoluted approach.

The analysis here is simple and the district court did not err—Smith '800 claims compounds and it discloses methods of using those compounds. Under *Sun Pharm.*, the district court was obligated to consider Smith '800's specification to determine the proper scope of its claims. Smith '800 discloses the use of its compounds in Sanger sequencing, which, as discussed above, anticipates or renders obvious the asserted claims. The '096 patent's claims are not patentably distinct from those of Smith '800 and the district court's finding of invalidity should be affirmed.

B. Consideration of obviousness-type double-patenting was proper because the district court gave the parties sufficient notice.

The district court gave Appellants sufficient time to respond to its

order requesting briefs on ODP. A court may grant judgment independent of a summary judgment motion "[a]fter giving notice and a reasonable time to respond" to the parties. Fed. R. Civ. P. 56(f). Appellants' ODP brief makes clear that they knew what the district court was asking and they addressed the issue head-on with a fulsome brief and a supplemental expert declaration. A17248-72. Appellants did not ask for additional briefing or additional time to prepare their brief; instead, they explained their disagreement with Promega's view of the law and facts and they argued, in their brief and at oral argument, that judgment in Promega's favor would not be appropriate. A17248-72, A18152-59.

Appellants did not object to the time constraints imposed by the district court because they did not need more time. Their argument now, on appeal, that the district court did not give them reasonable time to respond to its inquiry regarding ODP should be rejected.

Promega did not waive or forfeit its ODP defense. As an initial matter, the Supreme Court recently clarified the distinction between "waived" and "forfeited" defenses. "A waived claim or defense is one that a party has knowingly and intelligently relinquished; a forfeited plea is one that a party has merely failed to preserve." *Wood v. Milyard*, 132 S. Ct. 1826,

1832 n.4 (2012). Appellants do not actually argue waiver—indeed, nothing suggests it; instead, Appellants appear to argue forfeiture incorrectly styled as waiver. Regardless of the label, Appellants' argument fails.

Promega properly pled invalidity: "The claims of the '096 patent are invalid because they do not meet one or more of the conditions for patentability specified in *at least* 35 U.S.C. §§ 102, 103, 112 and 251." A1433 (emphasis added). Because ODP is a condition for patentability, Promega did not waive ODP. And the district court could have, but did not, require Promega to amend its pleading when the district court raised the ODP issue.

Appellants' forfeiture argument also fails because they can show no prejudice. Regional circuit law governs the question of forfeiture. *Ultra-Precision Mfg., Ltd. v. Ford Motor Co.*, 411 F.3d 1369, 1376 (Fed. Cir. 2005). "While Fed. R. Civ. P. 8(c) directs parties to raise affirmative defenses in the pleadings, a delay in raising an affirmative defense only results in waiver[9] if the other party is prejudiced as a result." *Schmidt v. Eagle Waste & Recycling, Inc.*, 599 F.3d 626, 632 (7th Cir. 2010). And "when parties argue

[9] Much of the pertinent case law that predates *Wood* appears to incorrectly identify forfeiture as waiver.

an affirmative defense in the district court, technical failure to plead the defense is not fatal." *DeValk Lincoln Mercury, Inc. v. Ford Motor Co.*, 811 F.2d 326, 334 (7th Cir. 1987). Appellants cannot establish prejudice. ODP was raised by the district court and Appellants submitted a complete brief and an expert declaration in response and further advocated for their position during an oral argument. Moreover, Appellants cannot establish prejudice because the § 103 analysis overlaps with the ODP analysis in this case. The district court considered the specification of Smith '800 in its double-patenting analysis. The effect of the exception is to transform the double-patenting analysis into a § 103 obviousness analysis. Because Appellants were fully aware of Promega's § 103 arguments based on Smith '800, they cannot argue prejudice based on the same argument set forth under the ODP framework.

Finally, any delay in raising the double-patenting issue was caused in no small part by Appellants' failure to challenge Smith '800 as prior art until the last minutes of discovery. It was only when Appellants attempted to assert an earlier date of invention that the ODP issue crystalized because ODP would apply even if Appellants were able to establish an earlier invention date for the '096 patent. Also, in their response to Promega's

second summary-judgment motion, Appellants attempted to eliminate Smith '800 as a § 103 reference by arguing that the § 103(c) safe-harbor applied. A16641. This argument also brought ODP to the forefront because the safe harbor does not apply to ODP references.

The asserted claims of the '096 patent cover a major, intended use of the compounds claimed by Smith '800. This use, Sanger sequencing, is disclosed in Smith '800's specification. The asserted claims are therefore invalid under ODP, which "encompasses any use for a compound that is disclosed in the specification of an earlier patent claiming the compound and is later claimed as a method of using that compound." *Sun Pharm.*, 611 F.3d at 1386. The broad claims of the '096 patent cover the disclosed use of Smith '800's compounds and represent a blatant attempt to improperly extend the term of Smith '800. The prohibition against ODP was formulated to prevent such injustices.

IV. Ruth '882 in combination with the knowledge of a person of ordinary skill in the art renders the asserted claims obvious.

The asserted claims are rendered obvious by Ruth '882 .[10] Claim 62 is invalid because the use of Ruth's fluorophore-labeled oligonucleotides in Sanger sequencing was obvious. When a single reference discloses all limitations of an asserted claim in different embodiments, it is obvious to combine the disclosures because "[c]ombining two embodiments disclosed adjacent to each other in a prior art patent does not require a leap of inventiveness." *See, e.g.*, *Boston Scientific Scimed*, 554 F.3d at 991.

There is no material dispute that Ruth '882 discloses claim 62's limitations in separate embodiments. Ruth '882 discloses the specific hybridization of its fluorophore-labeled oligonucleotides and their use as "tools in protocols involving nucleic acid hybridization techniques." A148[3:56-4:3], A149[6:26-28], A167[42:38-41], A11661. Sanger sequencing is an example of a nucleic acid hybridization technique. Appellants' expert, Dr. Dovichi, admitted as much:

> Ruth '882 patent indeed discloses a synthetic nucleotide that contains a fluorescent tag, the incorporation of that nucleotide into an oligonucleotide, and the hybridization of that

[10] The district court held that claim 67 was obvious in view of Ruth '882, but it expressed no opinion as to the other asserted claims.

> oligonucleotide to a complementary sequence. The Ruth '882 patent also discloses that this hybridization may be used to determine the presence of the target sequence.

A11661. Ruth '882 further discloses the extension of oligonucleotides at their 3' end with the enzyme polymerase. A147[1:59-64]. In particular, Ruth '882 contemplates using its fluorophore-labeled oligonucleotides in combination with enzymes, such as polymerase:

> [i]f one or more of the provided nucleotides are modified, for example to include a label, such modifications will be incorporated into the new strand. Only a limited array of modifications may be utilized in such a method . . . due to the interference of the modifications with the activity of the enzymes.

A147[2:3-8]. Thus, Ruth '882 explicitly taught that oligonucleotides can be modified so as to not interfere with polymerase. The specification further discloses a fluorophore-labeled oligonucleotide with a free 3' end. A158[23:22-27,24:22-27]. As such, it would have been obvious to a person of ordinary skill to combine these elements in Ruth '882 and use its fluorophore-labeled oligonucleotide in well-known Sanger sequencing, rendering claim 62 invalid as obvious.

Appellants' only argument to the contrary is that Ruth '882 does not explicitly disclose extendibility by polymerase. This argument makes no

sense, particularly in the obviousness context. It is undisputed that it was well known that hybridized oligonucleotides will extend in the presence of polymerase. There is no evidence in the record of a hybridized oligonucleotide that does not extend in the presence of a polymerase. The only argument advanced by Appellants' expert was that a person of skill in the art might be concerned about the size, weight or location of the fluorophore affecting hybridization to the complementary strand of DNA, which in turn could affect extension. A11663. But Ruth '882 states that the oligonucleotides are hybridized, and Dr. Dovichi admitted as much. A167[42:38-41], A11661. It follows that they will extend in the presence of a polymerase. Further, unrebutted evidence establishes that Ruth's fluorophore-labeled oligonucleotides were extendible by polymerase, A11339-91, and Dr. Ruth himself so testified, A18131-32. At a minimum, such extension is the epitome of obviousness.

Claim 62's dependent claims add nothing of substance. Claim 63's limitation requiring separation from the complementary strand is an inherent step in Sanger sequencing. Appellants admitted that claim 65's amine linkage limitation is disclosed in Ruth '882. A11666. Claim 70 requires a single fluorescent label, but Ruth '882 discloses that "one or

more" fluorophores may be attached. A147[2:3-8]. The only argument that Appellants' expert raised regarding claims 74, 80, 86, 92, and 98 is that Ruth '882 "does not disclose labeled extension products." A11666-67. This argument is thoroughly discredited in the above discussion of claim 62.

Because each limitation in claim 66 is required of the oligonucleotides and mixtures used in method claim 62, the analysis regarding that claim applies equally to claim 66 and Ruth '882 renders claim 66 invalid as obvious.

Claim 67 is also obvious in view of Ruth '882, as the district court held. Ruth '882 explicitly discloses modified oligonucleotides labeled with multiple fluorescent molecules, including "fluoresceins" and "rhodamines." A150[7:63-8:4]. As discussed in section II.B.2, references, such as, Tsuchiya, et al., provided a motivation to use multiple, different colored fluorophores in sequence analysis methods. A17188-90; A1719620. The existence of four different nucleotides in DNA also suggests using four different colored fluorophores. *See Dystar*, 464 F.3d at 1361. Appellants' expert explains how using different fluorophores was "a simple modification that would have been well within the ability of a person of ordinary skill in the art."A12621. There was a clear motivation to use

multiple, different colored fluorophores and their use was "a simple modification."

Promega's enablement arguments are not to the contrary. Promega's experts opined that single-lane sequencing with multi-colored fluorophores was not enabled because of multiple complications, which included partial overlap of the fluorophores' color spectra. A10206-09. But claim 67 only requires that the fluorophores be distinguishable, and mixed together for no claimed purpose. It does not require that they be suitable for use in single-lane sequencing and have no spectral overlap. Appellants' expert, Dr. Dovichi, named four specific fluorophores that are distinguishable from one another in spite of the partial overlap of their spectra and he further stated that many more fluorophores could be used. A12620-21. The district court properly concluded that claim 67 was obvious in light of Ruth '882.

V. Claim 62 and its dependents are invalid for failing to meet the written description requirements of § 112.

The district court correctly held that claim 62 and its dependents are invalid for failing to meet the written description requirements of § 112. To satisfy § 112's written description requirement, the specification must "'allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed.'" *See Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010).

"A claim encompassing two or more disclosed embodiments within its scope is a genus claim." *Billups-Rothenberg, Inc. v. Associated Reg'l & Univ. Pathologists, Inc.*, 642 F.3d 1031, 1037 (Fed. Cir. 2011). Claim 62 is therefore a genus claim directed to "any method of obtaining information about a genetic sequence," A-28, one species of which is the disclosed Sanger sequencing method. *See In re Guess*, 347 Fed. App'x. 558, 560 (Fed. Cir. 2009) (claim directed to guitar embodiments was genus claim). The '096 patent's limited disclosure of only a single embodiment—DNA Sanger sequencing—cannot support claim 62's breadth.

For biotechnological genus claims, like claim 62, "[o]ne must show that one has possession, as described in the application, of sufficient species

to show that he or she invented and disclosed the totality of the genus." *Carnegie Mellon Univ. v. Hoffmann-La Roche, Inc.*, 541 F.3d 1115, 1126 (Fed. Cir. 2008). In *Chiron Corp. v. Genentech, Inc.*, 363 F.3d 1247 (Fed. Cir. 2004), for example, a patent claimed all "monoclonal antibodies" with certain properties. This Court held that the specification's disclosure of only one type of monoclonal antibody was insufficient to describe the claim's scope. *Id.* at 1255. The same is true here. Claim 62 and its dependents cover any method of obtaining information about a genetic sequence, but only one method is disclosed. This limited disclosure is insufficient to support the genus. *See id.* For example, Promega's products involve generating information about a genetic sequence by using a pair of oligonucleotide primers to produce fragments of certain lengths, which is nowhere disclosed in the '096 patent. A1548-52. This method was not invented by the '096 inventors, but was invented after the '096 patent's application was filed. A12622-23. The '096 patent discloses only one embodiment, and this does not describe the entire genus of "any method of obtaining information about a genetic sequence."

Appellants incorrectly imply that claim 62 and its dependents are simply open claims that encompass any method that performs the steps

recited in the claims' body. This is incorrect. As the district court held, A77, claim 62 and its dependents are not simply directed to all methods that perform the steps recited in the claims' body. Claim 62's preamble is limiting, requiring that covered methods obtain information about a genetic sequence.[11] It is the steps that generate information about a genetic sequence that are absent from the specification, except for the limited disclosure of DNA sequencing. Claim 62 and its dependents are invalid for failing to meet the written description requirement.

VI. The district court properly excluded Mr. Greene's testimony because he ignored the parties' actual negotiated rate of 2% and could not support his rate of 10%.

In 2006, while the reissue was pending, the parties negotiated the Cross License, which included a 2% royalty rate for products inside the defined Field of Use ("IFOU") if a valid and infringed patent ever reissued.[12] The '096 patent reissued in 2012. Now, in this dispute over the '096 patent, Mr. Greene ignored this established 2% rate and opined that for products outside the field of use ("OFOU") the rate should be 10%. Greene's justification for ignoring the established rate was his assertion

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[11] No party appeals from this claim construction.

[12] The Field of Use is limited to paternity and forensic applications.

that during the 2006 negotiation, the parties did not know that the patent would reissue. A12574-76, A13325, A13335, A13352, A13354. But the 2% rate was specifically agreed upon for *if and when the patent did reissue*. A542, A544, A546. Because there are no changed circumstances between 2006 and the time of reissue, the only relevant question is whether justification exists for a higher rate OFOU.

Mr. Greene made at least two fundamental errors in arguing for a 10% royalty: 1) he discarded the established 2% rate in the Cross License without identifying material differences OFOU in 2012 compared to IFOU in 2006; and 2) he relied on a number of other licenses covering multiple and different patents without demonstrating economic or technical comparability or justifying his choice of a midpoint rate relative to just some of those licenses.

While Appellants now claim on appeal that Mr. Greene's analysis began with rate in the Cross License, it did not. As he unequivocally testified, he did not use any starting point for his purported analysis. A13308. Instead, Greene stubbornly ignored the Cross License rate established for products IFOU and did not even attempt to analyze what might be different about the products when used OFOU. A13311, A13315,

A13320-21, A13347, A13357-59. He admitted he could not determine which products fell IFOU and OFOU. A13311, A13315. As such, he could not show how the benefits of the invention were any different IFOU and OFOU. A13320-21, A13332-33, A13345, A13347. He did not account for the fact the many of the same products are sold IFOU and OFOU—the customers just use them differently. He admitted apportionment is necessary, but made no defensible attempt to do it. A13346, A13349. As the district court noted, he also failed to analyze the development of the OFOU market or Promega's variable profit margin OFOU compared to IFOU. A50-51. In reality, there simply was no difference between the actual negotiation IFOU in 2006, compared to the hypothetical negotiation OFOU in 2012. If the '096 patent claims an invention, its benefits are the same, and Mr. Green had no excuse for discarding the 2006 Cross License.

After discarding the license specifically negotiated between the same parties for the '096 patent, Greene relied upon a series of much older licenses with other parties, each covering multiple patents, none of which was the '096 patent. This Court requires that damages experts rely only on technologically and economically *comparable* licenses. *Wordtech Sys. v. Integrated Networks Solutions, Inc.*, 609 F.3d 1308, 1320 (Fed. Cir. 2010);

Lucent Techs. Inc. v. Gateway, Inc., 580 F.3d 1301, 1325 (Fed. Cir. 2009). Greene did no such comparability analysis. He neither knew of nor analyzed the material economic differences or similarities between the ’096 and the various licenses he recited. A13325, A13335, A13337-45, A13350-55. He similarly neither knew nor analyzed the technological comparability between the ‘096 and these same licenses, except to note in some instances that the license covered a related patent or earlier application that years later led to the ’096. A13337-45, A13353-55. And where a given license did include an application in the chain leading to the ’096, Mr. Greene did not provide any analysis regarding the importance or value of that application in the overall license covering many other patents.

Mr. Greene concluded his analysis by selecting a subset of the multi-patent licenses, and finding that the mid-point of the total royalty rates was about 10%. He then opined that the rate for the ’096 patent should be 10% OFUO. The district court properly excluded this opinion because Mr. Greene used “the midpoint of a range of royalty rates in disparate licenses for unknown different inventions as the estimate for a reasonable royalty.” A50. This was not a close call. Mr. Greene ignored the rate set by the parties for the ’096 patent in favor of the average of other multi-patent licenses he

did not analyze, in order to quintuple the rate for many of the same products. This Court's precedent mandated the district court's decision to exclude.

CONCLUSION

The Court should affirm the district court's judgment of invalidity of the asserted claims.

Dated: October 24, 2013 By: /s/ Martin R. Lueck

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CERTIFICATE OF SERVICE

I hereby certify that on October 24, 2013:

I filed or caused to be filed Plaintiff-Appellee's Opposition Brief with the Clerk of the United States Court of Appeals for the Federal Circuit via the CM/ECF system.

I also caused a paper copy of the foregoing brief to be personally served on Defendants-Appellants' principal counsel pursuant to Federal Rule Appellate Procedure 25(c)(1)(A).

I caused all counsel of record to be served via the CM/ECF system and electronic mail.

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CERTIFICATE OF COMPLIANCE

I hereby certify that the foregoing brief complies with the type-volume limitation set forth in Federal Rule of Appellate Procedure 32(a)(7)(B) and that it contains 13,753 words as calculated by the "Word Count" feature of Microsoft Word.

I also certify that this brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5), (6). The foregoing brief is prepared in a proportionally-spaced typeface, Book Antiqua, and is in 14-point font.

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